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| EXAMINER | |
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| GARCIA, SANTIAGO | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/575,160 | ADACHI, FUMIYUKI | |
| | Examiner | Art Unit | |
| | SANTIAGO GARCIA | 4147 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *26-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/07/07 and 04/10/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 26-27, 29, 31-35, 40 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Seki (US 20040190598).

As per claim 26, Seki teaches a transmitter apparatus for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method (Seki, page 3, ¶ [0029]), said transmitter apparatus being characterized by comprising (Seki, fig.3 is such transmitter);

an interleaver for generating interleave-processed data being obtained by performing specified rearrangement processes on frequency domain data to which said data symbols are converted (Seki, fig.3 and ¶ [0072] component 56 frequency interleaver and output thereof.)

and an IFFT processing part for converting said interleave-processed data to time domain signals (Seki, fig.3 and ¶ [0072] lines 5-9 “An IFFT unit 57 applies an IFFT (Inverse Fast Fourier Transform) to the subcarrier signals that enter in parallel, thereby

effecting a conversion to an OFDM signal (a real-part signal and an imaginary-part signal) on the time axis."),

wherein; said interleaver generates and outputs N pieces of data from Q (N>Q) data symbols inputted (Seki, fig.3 "[0072] A frequency interleaver 56 rearranges the code-multiplexed subcarriers S1 to N by frequency interleaving, thereby distributing the subcarrier signals along the frequency axis, in order to obtain frequency-diversity gain." An interleaver outputs more data than it receives by scrambling the data that it receives; See fig. 3, 5 in which Si(Q) is greater than output N(N) of the interleaver. In this instant Q is M=2 for each user, see ¶ [0071] ).

As per claim 27, Seki further teaches, a transmitter apparatus according to claim 26, being N/Q columns, characterized by further comprising an FFT processing part for converting said data symbols to said frequency domain data (Seki, fig.3 and ¶ [0070-71] component 54. In order to have Inverse FFT there must of been FFT before hand. So to convert a signal in the time domain to N x M number of sub-carrier sets of spreader 54 and 54 assigned to each user).

As per claim 29, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that said IFFT processing part performs N-point IFFT processes on N pieces of data outputted from said interleaver (Seki, fig.3 and lines 1-5 [0072-71] "A frequency interleaver 56 rearranges the code-multiplexed subcarriers S1 to N by frequency interleaving, thereby distributing the subcarrier signals along the

frequency axis, in order to obtain frequency-diversity gain." After the interleaver 54 then N points go into the IFFT 57).

As per claim 31, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that specified N pieces of data read from said interleaver memory are outputted to said IFFT processing part (Seki, fig.3 and ¶ [71-72] components 56 to 57).

As per claim 32, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that data symbols of said specified transmission method are spread signals (including the case of spreading rate of 1) (Seki, fig.3 and background [007] “With MC-CDMA, partitioning into a plurality of subcarriers is achieved by serial-to-parallel conversion of transmit data and spreading of orthogonal codes in the frequency domain.” This case is being used in an MC-CDMA system which uses spreading. After going threw the Serial to parallel converter 53 they become symbols. [0059] “Further, the data is arranged that multicode multiplexing is performed upon assigning a plurality of spreading codes to the same user.” This would be a spreading rate of 1).

As per claim 33, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that data symbols of said specified transmission method are multi-carrier signals (Seki, background “[0002] This invention relates to a multicarrier

CDMA transmission system and transmission method." The data symbols are created after going threw the Serial/Parallel converter ).

As per claim 34, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that data symbols of said specified transmission method are OFDM signals (Seki, fig.3 "OFDM signal" above component 58 ).

As per claim 35, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that data symbols of said specified transmission method are data symbols of variable data rate (Seki, By having OFDM signals two advantages are offered which are ease of channel equalization and the ability to allow variable data rates per subchannel or user ).

As per claim 40, Seki further teaches, a communication system according to claim 36, being characterized in that; said de-interleaver is provided with a de-interleaver memory for storing output data of the FFT processing part of said receiver apparatus (Seki, fig.4 The FFT is 62 going into frequency de-interleaver 63 which much have a buffer (memory/register) in order to be able to pass on the data to the IFFT components 65-66),

data of N points outputted from the FFT processing part of said receiver apparatus are written into specified positions in said de-interleaver memory (Seki, fig.4 and ¶ [0076] output of 54),

and Q pieces of data written into specified positions as data to be processed out of N pieces of data written into said specified positions are read from said de-interleaver (Seki, fig.4 component 63 rearranges the data therefore it is in an specific location. Also see ¶ [0076] ).

As per claim 41, Seki further teaches, a communication system according to claim 36, being characterized in that specified Q pieces of data read from said de-interleaver memory (Seki, fig.4 and ¶ [0076] output of 54) are outputted to said IFFT processing part of said receiver apparatus (Seki, fig.4 component 63 to 65 handoff is the output to the IFFT. Also see ¶s [0076-0078]).

2. Claims 36-38 and 40-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Seki (US 20040190598).

As per claim 36, Seki teaches, a communication system comprising;

a transmitter apparatus for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method (Seki, fig.3 is the transmitter which after the user data goes threw S/P converter turns into symbols)

and a receiver apparatus for restoring said data symbols on the basis of the received reception signals obtained by receiving said transmission signals, said system being characterized in that (Seki, fig.4 and and ¶ [71-72] is the receiver working with transmitter in figure 3);

said transmitter apparatus comprises an interleaver for generating interleave-processed data being obtained by performing specified rearrangement processes on frequency domain data to which said data symbols are converted and (Seki, fig.3 and ¶ [71-72] component 56 frequency interleaver and output thereof)

an IFFT processing part for converting said interleave-processed data to time domain signals (Seki, fig.3 [0072] lines 5-9 “An IFFT unit 57 applies an IFFT (Inverse Fast Fourier Transform) to the subcarrier signals that enter in parallel, thereby effecting a conversion to an OFDM signal (a real-part signal and an imaginary-part signal) on the time axis.”),

and said receiver apparatus comprises an FFT processing part for converting time domain signals to frequency domain data (Seki, fig.4 and ¶ [0076] page 6 components 62 FFT and component)

and a de-interleaver for generating de-interleave-processed data being obtained by performing specified rearrangement processes on said converted frequency domain data (Seki, fig.4 and ¶ [0076] page 6, element 63 frequency de-interleaver ),

wherein; said de-interleaver generates and outputs Q pieces of data from N (N>Q) pieces of data inputted (Seki, It is inherent that fig. 4 shows element 63 a frequency de-interleaver receives N pieces of data inputted greater than outputs Q for each user. In this instant Q is M=2 see ¶ [0071] ).

As per claim 37, Seki further teaches, a communication system according to claim 36, being characterized in that; said transmitter apparatus further comprises an

FFT processing part for converting said data symbols to said frequency domain data (Seki, fig.4 and ¶ [0076-77] page 6 FFT component 62), and said receiver apparatus further comprises an IFFT processing part for converting said de-interleave-processed data to time domain signals (Seki, fig.4 and ¶ [0077] page 6 Block 65 with 66. By doing orthogonal code IFFT is happening. Also IFFT would have to happen to get back to the original data ).

As per claim 38, Seki further teaches, a communication system according to claim 36, being characterized in that said FFT processing part of said receiver apparatus performs N-point FFT processes on N pieces of reception data which have been received and converted from serial to parallel (Seki, fig.3 and fig.4 in the transmitter the data is being converted by component 53 S/P then going to the receiver as parallel then the receiver in fig.4 takes into the FFT. See fig. 3, 5 in which Si(Q) is greater than output N(N) of the interleaver. Also see ¶ [0077]).

As per claim 42, Seki further teaches a communication system according to claim 36, being characterized in that data symbols of said specified transmission method are spread signals (including the case of spreading rate of 1) (Seki, fig.3 and background [007] “With MC-CDMA, partitioning into a plurality of subcarriers is achieved by serial-to-parallel conversion of transmit data and spreading of orthogonal codes in the frequency domain.” This case is being used in an MC-CDMA system which uses spreading. After going threw the Serial to parallel converter 53 they become symbols. [0059] “Further,

the data is arranged that multicode multiplexing is performed upon assigning a plurality of spreading codes to the same user." This would be a spreading rate of 1)

As per claim 43, Seki further teaches, a communication system according to claim 36, being characterized in that data symbols of said specified transmission method are multi-carrier signals (Seki, background "[0002] This invention relates to a multicarrier CDMA transmission system and transmission method." The data symbols are created after going threw the Serial/Parallel converter ).

As per claim 44, Seki further teaches a communication system according to claim 36, being characterized in that data symbols of said specified transmission method are OFDM signals (Seki, fig.3 "OFDM signal" above component 58 ).

As per claim 45, Seki further teaches, a communication method being a transmission method for performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method (Seki, page 3, ¶ [0029] ), said communication method being characterized by comprising (Seki, fig.3 is such transmission method);

an FFT processing step for converting said data symbols to frequency domain data (Seki, fig.3 and ¶ [0070-71] component 54. In order to have Inverse FFT there must of been FFT before hand. Further more FFT can be achieved by applying orthogonal code.),

an interleave-processing step of performing rearrangement processes on said converted frequency domain data (Seki, fig.3 and ¶ [0072] component 56 frequency interleaver and output thereof.),

and an IFFT processing step of converting said frequency domain data to time domain signals, wherein (Seki, fig.3 [0072] lines 5-9 “An IFFT unit 57 applies an IFFT (Inverse Fast Fourier Transform) to the subcarrier signals that enter in parallel, thereby effecting a conversion to an OFDM signal (a real-part signal and an imaginary-part signal) on the time axis.”);

said interleave-processing step generates and outputs N pieces of data from Q (N>Q) data symbols inputted (Seki, fig.3 “[0072] A frequency interleaver 56 rearranges the code-multiplexed subcarriers S1 to N by frequency interleaving, thereby distributing the subcarrier signals along the frequency axis, in order to obtain frequency-diversity gain." An interleaver outputs more data than it receives by scrambling the data that it receives; See fig. 3, 5 in which Si(Q) is greater than output N(N) of the interleaver. In this instant Q is M=2 for each user see ¶ [0071] ).

As per claim 46, teaches a communication method comprising;

a transmission step of performing transmission using transmission signals generated on the basis of data symbols of a specified transmission method (Seki, page 3, ¶ [0029])

and a reception step of receiving transmission signals transmitted by said transmission step and restoring said data symbols, said method being characterized in that (Seki, fig.4 is the receiver. Also ¶s [0075-76] );

said transmission step comprises an FFT processing step of converting said data symbols to frequency domain data (Seki, fig.3 and ¶ [0070-71] component 54. In order to have Inverse FFT there must of been FFT before hand. Further more FFT can be achieved by applying orthogonal code.),

an interleave-processing step of performing interleave processes on said converted frequency domain data and an IFFT processing step of converting said frequency domain data to time domain signals (Seki, fig.3 and lines 1-5 [0072-71] “A frequency interleaver 56 rearranges the code-multiplexed subcarriers S1 to N by frequency interleaving, thereby distributing the subcarrier signals along the frequency axis, in order to obtain frequency-diversity gain." After the interleaver 54 then N points go into the IFFT 57),

and said reception step comprises an FFT processing step of converting said time domain signals to frequency domain data (Seki, fig.4 component 62 and ¶ [0076] ),

a de-interleave-processing step of performing rearrangement processes on said converted frequency domain data (Seki, fig.4 component 63 is a de-inteleaver. De-inteleaver rearranges the sub-carrier signals. Also see ¶ [0076] )

and an IFFT processing step of converting said frequency domain data to time domain signals, wherein (Seki, fig.4 components 65 and 66 are the IFFT. Also see ¶s [0077-78] );

said interleave-processing step generates and outputs N pieces of data from Q (N>Q) data symbols inputted (Seki, fig.3 "[0072] A frequency interleaver 56 rearranges the code-multiplexed subcarriers S1 to N by frequency interleaving, thereby distributing the subcarrier signals along the frequency axis, in order to obtain frequency-diversity gain." An interleaver outputs more data than it receives by scrambling the data that it receives; See fig. 3, 5 in which Si(Q) is greater than output N(N) of the interleaver. In this instant Q is M=2 for each user, see ¶ [0071] )

and said de-interleave-processing step generates and outputs Q pieces of data from N (Q<N) pieces of data inputted (Seki, It is inherent that fig. 4 shows element 63 a frequency deinteleaver receive N pieces of data inputted great than output Q for each user. In this instant Q is M=2 see ¶ [0071] ).

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki (US 20040190598) in view of Stephens (US 7,474,608).

As per claim 28, Seki further teaches, a transmitter apparatus according to claim 26, being characterized in that said FFT processing part performs, on Q data symbols

inputted (Seki, fig.3 and ¶ [0070-71] Input data of user 1 is considered Q going into 53 S/P converter then going into the FFT component 54.)

Seki does not teach, Q-point FFT processes.

Stephens teaches, Q-point FFT processes (Stephens, page 4 ¶ 27 lines 53-55 "In certain embodiments, method 400 may include performing 405 a FFT on a received transmission and examining 410 I and Q components after the FFT." Also page 3, lines 34-46).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Seki to include Q points/component after the interleaver.

The motivation would be to be able to use different modulation schemes such as those thought by Stephens (Stephens, page 3 lines 64-68 and page 4, lines 1-10).

As per claim 30, Seki teaches, a transmitter apparatus according to claim 26, being characterized in that;

said interleaver is provided with an interleaver memory for storing output data of said FFT processing part (Seki, fig.3 and ¶ [0072] page 6 The FFT is 54 going into frequency interleaver 56 which much have a buffer (memory/register) in order to be able to rearrange the code sub-carrier S1-SN by frequency interleaving),

from said FFT processing part are written into specified positions in said interleaver memory (Seki, fig.3 ¶ [0072] page 3 component 54 to component 56 buffer),

and specified N pieces of data including Q pieces of data written into said specified positions and data written into other positions than the positions into which

said Q pieces of data are written are read from said interleaver (Seki, fig.3 from component 56 to IFFT the data is being read to that component. Also see fig. 3, 5 in which Si(Q) is greater than output N(N) of the interleaver ).

Seki does not teach, data of Q points outputted data of Q points outputted (Stephens, page 4 ¶ 27 lines 53-55 "In certain embodiments, method 400 may include performing 405 a FFT on a received transmission and examining 410 I and Q components after the FFT." Also page 3, lines 34-46).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Seki to include Q points/component after the FFT.

The motivation would be to be able to use different modulation schemes such as those thought by Stephens (Stephens, page 3 lines 64-68 and page 4, lines 1-10) to improve system adaptability.

5. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seki (US 20040190598) in view of Stephens (US 7,474,608).

As per claim 39, Seki teaches, a communication system according to claim 36, being characterized in that said IFFT processing part of said receiver apparatus IFFT processes on Q pieces of rearrangement-processed data outputted from said de-interleaver (Seki, fig.4 Block 65 with 66. By doing orthogonal code IFFT is happening. Also IFFT would have to happen to get back to the original data).

Seki does not teach, performs Q-point

Stephens teaches, performs Q-point (Stephens, page 4 ¶ 27 lines 53-55 and page 3, lines 34-46)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Seki to include Q points/component after the de-interleaver.

The motivation would be to be able to use different modulation schemes such as those thought by Stephens (Stephens, page 3 lines 64-68 and page 4, lines 1-10).

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SANTIAGO GARCIA whose telephone number is (571)270-5182. The examiner can normally be reached on MONDAY- FRIDAY 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hai, Tran can be reached on (571) 272-7305. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business

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/SG/
06/08/2009
/Hai Tran/
Supervisory Patent Examiner, Art Unit 4147